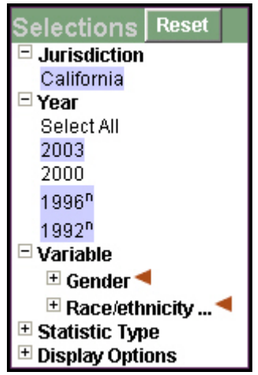
SIGNIFICANCE TESTS AND REGRESSION

Observed differences between NAEP data do not always indicate actual differences in academic performance. Sampling or statistical error must be ruled out before data are considered reliable. NDE provides significance tests for that reason.

Conducting a Significance Test

Significance tests must be set up thoughtfully. A sound approach is to focus on a single variable, and investigate its data across years, across jurisdictions, or across its own values – for instance, across "male" and "female" within the variable Gender.
To conduct a significance test

1. Decide the variable you want to test.
2. Decide whether to test for differences across years, jurisdictions, or the variable's values.
3. On the Results page, click Find Out.
4. Select Jurisdiction and Year. Multiple selections are possible. Choose at least one criterion wherever the red arrow appears.
5. Select Variables. Multiple selections are possible.
6. Select Statistic Type, if there is a choice.
7. Select Option, if you want to see the fully detailed results. For some tests, it is possible to graph the data in a map.
8. Click Compute in the Preview panel.



Control panel for a significance test

Reading Significance Test Results

The results table (or tables) will be displayed in the Preview panel. Read results across rows, not down columns. Symbols and color-coding indicate how row values compare with column values.

	2003	2000	1996n
2003		>	>
2000	<		=
1996n	<	=	

No test was performed
< Significantly lower
> Significantly higher
= No significant difference

At left, table with significance test results and legend below, showing that 2003 results are significantly higher than 2000 results

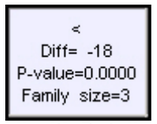
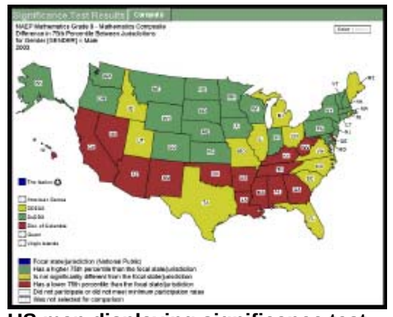


Table cell with Details Shown



US map displaying significance test results

Regression

Regression analysis can test whether variables relate to changes in NAEP performance. While regression is simpler to set up than significance tests, it is a technique intended for knowledgeable users. This guide cannot explain the intricacies of regression analysis, but can explain the setup process.
To conduct regression analysis,

1. Click the "Get a regression analysis" link.
2. Select one jurisdiction and one year.
3. Select one or more variables.
4. Click Compute in the Preview panel.

Technical Requirements for NAEP Data Explorer

NDE runs best on Internet Explorer version 5.5 or higher.
NDE also uses certain multimedia or document files that require certain plug-ins:

- SVG viewer for data graphics (NAEP recommends Adobe SVG Viewer 3.0)
- Flash for tutorial animations (Macromedia Flash, v. 5+)
- Audio player for tutorial audio (Apple QuickTime v. 3+, Windows Media Player)

NAEP DATA EXPLORER

The NAEP Data Explorer (NDE) provides access to detailed results from NAEP's national, state, and urban district assessments. The data are based on information gathered from the students, teachers, and schools that participated in NAEP assessments.

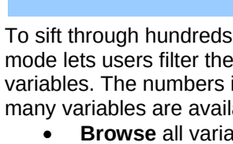
How to Use NDE

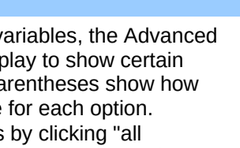
Choose a Mode
NDE has two modes for retrieving data, Quick Start and Advanced.

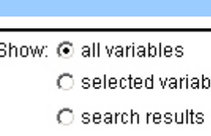
- **Quick Start** accesses the most popular data sets and simplified queries.
- **Advanced** accesses all NAEP data (more than 4,000 variables), advanced table formats, and regression.

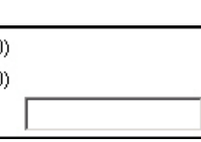
Query the Data
These four steps describe generally how to get data and develop data queries in either mode. Click the arrow buttons to move between pages. Get data on the Results page.

Select the Criteria ▶ **Format the Table** ▶ **Get and Graph the Data** ▶ **Run Statistical Tests**



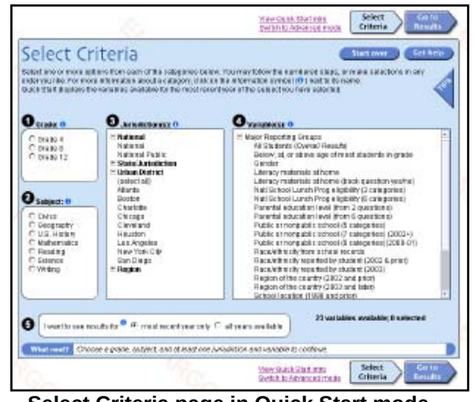






Select Criteria

- Criteria include **grade**, **subject**, **jurisdiction**, and **variables.**
- **Assessment year** is also a criterion, but the choice is optional.
- Click to select criteria.
- Multiple selections are possible for jurisdictions and variables.
- Some jurisdictions and many variables are not available for all grades and subjects.
- Unavailable jurisdictions and variables appear in gray.
- Deselect criteria to make incompatible jurisdictions and variables available again.

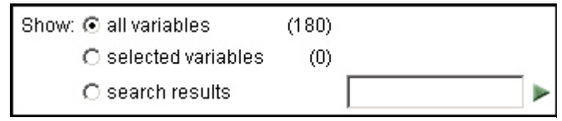


Select Criteria page in Quick Start mode

Gap Data
"Gaps and Changes in Gaps" is a variable that describes differences between subgroups of students within the same jurisdiction. Select gap data at the bottom of the variables list. Select only one jurisdiction. No other variables may be selected.

Search Variables in Advanced Mode

To sift through hundreds of variables, the Advanced mode lets users filter the display to show certain variables. The numbers in parentheses show how many variables are available for each option.



Search and display controls in Advanced mode

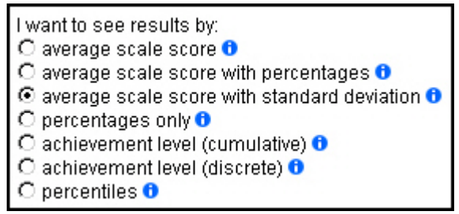
- **Browse** all variables by clicking "all variables" in the display control box, then clicking the ⊞ nodes to open different categories and view their contents.
- **Search** by typing keywords into the search field, then clicking the triangle button. Search results will appear in boldface in the list box.
- **Filter** the list to display only chosen variables by clicking "selected variables."

FORMATTING TABLES

Performance Measures

NDE can analyze four different kinds of results, or "performance measures". Select the kind you want through the radio button set.

- **Scale scores**: These are scores that reflect student performance on a scale of 0-500 or 0-300, depending on the subject.
- **Achievement levels**: For all assessments, three scale scores are set as boundaries between certain skill levels recognized by NAEP. Students who attain or exceed these scores are categorized as at or above *Basic*, at or above *Proficient*, or at *Advanced*.
- **Percentiles**: These are particular scores below which some percentage of students scored. For example, if the 75th percentile is 381, it means 75 percent of all students scored below 381.
- **Percentages**: These indicate the proportion of students represented in the table cell. Percentages reflect demographic information, not scores.



Performance measure selection box

Cross-Tabulation of Variables (N-Way Tables)

When multiple variables are chosen, NDE normally creates tables for each variable. An n-way table cross-tabulates "n" variables in the same table, which can show possible relationships between those variables. Cross-tabulations can be created in both modes, but the procedures and capabilities in each mode are different.

Quick Start 2-Way Table

Quick Start only cross-tabulates two variables at a time.

1. Select "cross-tabulation."
2. Select a variable for "Variable 1."
3. Select a second variable for "Variable 2."
4. Click Update Table (or Update Graph).

Gender [GENDER] x Race/ethnicity fro	
Gender	Race/ethnicity from scho
Male	White
	Black
	Hispanic

Partial view of 2-way table

Advanced N-Way Table

1. Select "cross-tabulation." The table is created automatically.
2. Shift columns horizontally as desired using the arrow links above each column.
3. Remove an unwanted column from the table by clicking its icon.

Collapsing Data Categories

Categories of data—variables or jurisdictions—may be "collapsed" or combined for purposes of table display in Advanced mode.

To collapse categories,

1. Click the collapse icon over the column that contains categories to be collapsed. A control panel appears.
2. In the control panel, select the categories to collapse.
3. Name the new category in the appropriate text field.
4. Decide whether to keep or remove the categories being collapsed from the table display.
5. Click Update Table.

Jurisdictions	Average Scale Score
New Hampshire	246 (1.0)
New Jersey	240 (1.3)
New Mexico	224 (1.2)
New States (collapsed)	237 (0.7)
New York	237 (1.0)

Data for jurisdictions and a collapsed category that comprises them

More Advanced Formatting Controls

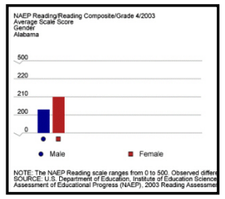
Making Graphs

Reset: Reset restores the default settings on the page that is open. It does not clear criteria on Select Criteria.

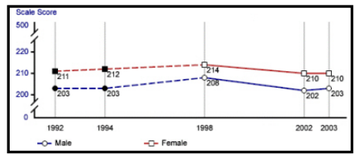
Subscale: Subscale lets you pick a constituent part of an overall subject -- for example, the geometry subscale within mathematics.

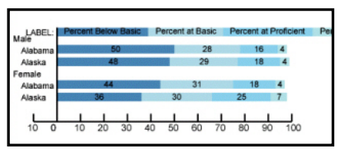
Missing Data: This category shows the percentage of respondents for whom membership in a particular response category is unknown because no response was given.

Types of Graphs



Bar charts show scale score and percentages



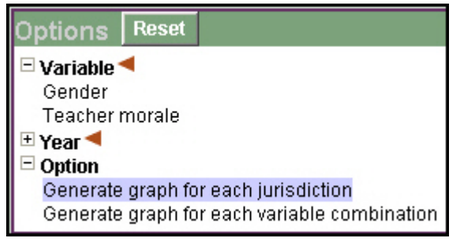


Stacked bar charts show achievement level data

Printing and Saving

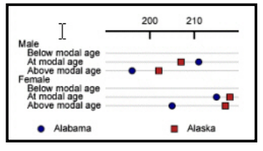
NDE can graph tables, including n-way tables.

1. In the Go to Results page, click "graphic."
2. Choose variables, years, and jurisdictions, if available. Make choices where red arrows appear. Based on those selections, the Preview panel will show the kind of chart that will be displayed.
3. Under Option, choose how to organize the data within the graphs. Pick whether to display data by jurisdiction, or by variable.
4. Click Get Graph.



Options panel for creating graphics – Preview panel not shown

NDE graphs several different kinds of graphs, depending on the criteria entered in the query.



Cross-tab plots show

Trend line charts show scale score -way and percentage data over time

Box and whisker charts, also known as **box plots**, show percentile data

Graphics – NDE uses the scalable vector graphic (SVG) format for graphics.
To copy NDE graphics into Word,

1. Right-click on the image and select Copy SVG.
2. Open the file that will use the image.
3. Under the Edit menu, select Paste Special.
4. Click Bitmap or Device-Independent Bitmap.
5. Click OK.

Tables – To save NDE tables to Excel,
Click Print/Save, then select and copy the table into an Excel file.
OR
Click Export to Excel. Most users see a dialogue box next. Click Save, then open the file in Excel.

Number Precision – NDE accesses data with up to 8 decimal places' worth of precision, although only 3 places are visible. In NDE, click the "+" and "-" icons to adjust precision.
To adjust precision in Excel,

1. Select the data cells to format.
2. In the View menu, open Formatting toolbar.
3. Select Increase Decimal or Decrease Decimal.

Printing – To print an NDE page,

1. Click Print/Save on the page. This strips out headers, footers and non-data.
2. Print as usual.